

THE FUTURE OF CALIFORNIA FLORISTICS AND SYSTEMATICS: COLLECTING GUIDELINES AND DOCUMENTATION TECHNIQUES¹

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ABSTRACT

At the Jepson Symposium, a workshop entitled "The Future of California Floristics and Systematics: Collecting Guidelines and Documentation Techniques" was convened on 4 June 1994, to prepare and approve by consensus a series of findings and recommendations that can be used to improve substantially the documentation of the environmental review process and scientific methodology so that preparation and preservation of botanical voucher specimens will become a professional standard. The workshop was attended by fifty-one participants who approved the findings and 14 recommendations in four major areas of concern: (1) documentation of environmental analyses with herbarium voucher specimens; (2) documentation of experimental research with herbarium voucher specimens; (3) presentation of hierarchical data on specimen labels; and (4) what will the future hold for documentation of California's botanical heritage?

Two approaches can be developed for the Jepson Symposium workshop topics "collecting guidelines" and "documentation techniques": (1) How shall investigators of the California flora decide what and when to collect? and (2) What kinds of data shall be recorded that will be presented on the herbarium specimen labels? With the publication of *The Jepson Manual* (Hickman 1993), another question might also be raised by some investigators, "Should we continue to collect the California flora, and if so, how should we go about continuing the effort?"

Because of state and federal requirements for environmental review of proposed development and the regulation of species of special interest and environmentally sensitive habitats such as wetlands, numerous environmental impact reports (EIR's), environmental im-

¹ The executive council of the California Botanical Society, the boards of the California Native Plant Society, and the Association of California Herbaria have endorsed each of the 14 recommendations offered by the participants of this workshop.

pact statements (EIS's), environmental assessments (EA's), and other types of reports are being generated that often record important aspects of the California flora, but that in great majority are not documented by voucher specimens. Without vouchers deposited in institutional herbaria, the scientific and even legal credibility of these reports is suspect at best, and their long-term value is minimal in spite of the large sums of money spent in producing the documents. In southern California, it is not uncommon for approximately \$1 million to be spent for a specific plan and associated EIR for larger development projects.

In another realm of investigation, scientific studies conducted at academic institutions often can be constrained by today's limited funding, which makes impractical the extensive plant collecting associated with broad and often unfocused floristic inventories. Thus another question could be asked, "What can we afford to document with collections and who is going to pay for the maintenance of these collections?" Furthermore, at these same institutions, important laboratory-based and greenhouse-based studies are largely undocumented by voucher specimens, a situation that unfortunately emphasizes the lack of cooperation and even lack of understanding among (1) the more traditionally-trained, organismal field biologists and (2) the laboratory-trained, molecular biologists.

To further compound the issue of documentation, the recently-achieved widespread use of computers in herbaria and the development of software for sophisticated databases, which include specimen label data, have resulted in the need to re-evaluate the type of data presented on labels when collections are made. The frequent lack of hierarchical provenance (purpose or project-related data), geographic, and habitat data sets, or source of experimental material, diminishes greatly the usefulness of the computerization efforts.

The overall need for accurate, detailed documentation of research, be it field-oriented or laboratory-oriented, is perhaps as great as it ever has been. Whether investigators are documenting a plant species in the field or with voucher material for laboratory analyses, the role of herbaria as repositories of preserved specimens and label data is indispensable in the continuing investigation of the California flora. Support for focused projects, whether they are academic or applied, must continue and the documentation of these projects with preserved voucher specimens must be expanded to new areas of investigation.

Concern and even alarm for the lack of professional documentation of academic and applied botanical research fueled our participation in this symposium and our desire to organize the workshop *The Future of California Floristics and Systematics: Collecting Guidelines and Documentation Techniques*. The purpose of this workshop, held at the University of California, Berkeley, on 4 June 1994, was to prepare and approve by consensus a series of findings

and recommendations that can be used to improve substantially documentation of the environmental review process and scientific methodology so that preparation and preservation of botanical voucher specimens will become a professional standard. This purpose is consistent with the overall purpose of the Jepson Symposium, as reported by The Friends of The Jepson Herbarium (Anonymous 1994): . . . The Friends are sponsoring a symposium to explore the challenging opportunities of future research, education, and conservation of California's unique flora. As we move toward the 21st century, a continuing dialogue is essential among interested individuals, agencies, and academics. Only through cooperation and communication can we begin to understand and protect our native plants.

WORKSHOP PROCEDURE

Prior to this workshop, the panelists prepared a draft set of "findings" and "recommendations", copies of which were presented to the workshop participants. Panelists presented introductions to each of four topics, which were followed by discussions from participants. Phone and written polls also were taken by panelists prior to the workshop to provide evidence on the practice of botanical documentation with voucher specimens and on the methods of specimen preparation, if and when vouchers are prepared. Following presentation and discussion of topics, a panelist read the draft findings or recommendations and a motion was made to adopt the findings by consensus. The panelist then called for discussion of the findings or motions and for proposed amendments. Amended findings or recommendations then were adopted by consensus when the earlier motion to adopt was seconded by a workshop participant. We provide a review of participant discussion following each workshop finding and recommendation. The following is a breakdown of the participant affiliations as determined from a workshop register ($n = 51$): academics (37.3%); agencies (9.8%); botanic gardens (9.8%); consultants (7.8%); individuals (11.8%); nurseries (3.9%); and societies (19.6%). This analysis of participants is, however, potentially misleading, because many participants who indicated their primary affiliation to be academic, botanic garden, or society also serve as environmental consultants, and many of the consultants also are affiliated with one or more societies. Nonetheless, workshop participants were overwhelmingly professional botanists who have diverse professional orientations.

FINDINGS AND RECOMMENDATIONS

As a result of the Jepson Symposium workshop entitled *The Future of California Floristics and Systematics: Collecting Guidelines and Documentation Techniques*, the participants by consensus make

the following findings and offer the following recommendations and discussions:

Topic I- Collecting Guidelines: Documentation of Environmental Analyses with Herbarium Voucher Specimens

WORKSHOP FINDINGS: Environmental documents produced as a result of the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) processes are professionally documented with botanical voucher specimens by a small percentage of the total work conducted by environmental consulting companies. This situation results in the loss of opportunities to substantiate project conclusions and in the loss of botanical information that could be invaluable for subsequent applied and academic studies.

An informal phone poll of ten large to small environmental consulting companies, which was conducted by the chair prior to the workshop, revealed that all but one company collected voucher specimens for less than one percent of the plants listed in their reports, and the tenth company reported the figure to be less than five percent. Of those specimens collected, most consultants reported that they largely collected plants for identification purposes and that the majority of these collections were never deposited in a formal herbarium. These figures and methodology were consistent with the situation experienced by workshop participants. Because participants in this workshop are alarmed at the lack of professional documentation of environmental work, we offer the following recommendations to the environmental community and to local, state, and federal regulatory and advisory agencies:

Recommendation 1. Environmental review projects (e.g., EIR's, EIS's, EA's) that are conducted in the State of California and that include botanical field observations should also include voucher specimens, and/or photographic documentation consistent with existing standards, deposited in one or more herbaria listed in *Index Herbariorum, Ed. 8* (Holmgren et al. 1990).

Perhaps the most extensive debate of the workshop centered around the extent to which all environmental reports should be documented by botanical voucher specimens and whether or not it was acceptable to deposit only photographs of particularly rare taxa or populations. Consensus by participants that environmental review projects should be documented by vouchers demonstrates the importance we place on botanical documentation and the need to improve current practices. Only when a particular taxon is determined to be too rare or endangered to collect a voucher specimen should a photograph be used as a voucher. For genera with many species, a photograph may

not provide sufficient information for someone to determine independently the identity of a taxon.

The role of various types of herbaria may differ regarding the issue of accepting vouchers for environmental reports. The panelists conclude that because many small herbaria are not listed in *Index Herbariorum*, voucher specimens deposited in these herbaria may not be available to a wide range of interested parties. Thus small herbaria that wish to serve as repositories for vouchers should become listed formally. The role of herbaria at public versus private institutions was raised by a reviewer of this paper, who pointed out that two of the three major herbaria in California are private and their role and the role of other private herbaria could be quite different in the responsibility of accepting vouchers, particularly those mandated by legislation. This reviewer also raised the concern as to whether a particular herbarium would have the alternative to accept in total, in part, or not at all a particular set of specimens generated from an environmental study. These issues, concerns, and questions regarding the role of various herbaria warrant additional discussion at a statewide level.

Recommendation 2. The thoroughness of documentation for a particular project should be equivalent to the importance of the study, but in any case should include collection of voucher specimens for special status species studies and noteworthy botanical observations (e.g., range extensions; state and county records; rediscoveries).

Much discussion was directed toward the extent to which project checklists should be documented. Should all plants listed in a report be documented by a voucher specimen? What is meant by the importance of a project? There was agreement that a purposefully vague recommendation would provide project reviewers with regulatory authority the flexibility to make individual determinations about specific projects. In some cases, entire checklists might warrant documentation with voucher specimens, whereas others might warrant documentation of only noteworthy observations. Weedy taxa (e.g., *Taraxacum officinale*) or more obvious locally common taxa (e.g., *Sequoia sempervirens*) might not have to be collected. A notation such as an asterisk could be made by each unvouchered observation. In any case, it was suggested by some participants that importance of a project should be considered a measure of project complexity and scope.

A reviewer of this manuscript also suggested that the length of time certain vouchers must be kept is another area for consideration. Rather than in perpetuity, vouchers for some projects could be maintained for a particular length of time while the legal technicalities of the project are under review, but might not necessarily be main-

tained after the legal process has gone to completion. This approach apparently is practiced currently by some consulting companies. The end result of only temporarily preserving vouchers at institutional herbaria or in corporate collections, however, is the eventual loss of material for future systematics studies and the loss of potentially important information on a site's botanical diversity, as well as the future inability to check for the accuracy of plant identifications and distribution records presented in the environmental reports.

Recommendation 3. Clients (e.g., private or public permit applicants) for whom environmental studies are conducted should be held financially responsible for the collection, identification, and curation of botanical vouchers; otherwise there is little chance that the current lack of documentation will improve.

For a little extra money, a much more worthwhile review effort could be undertaken. A client's money would be more wisely spent if vouchers were collected and deposited in a formal herbarium than if the environmental review was not documented professionally. During the phone poll taken by the workshop chair, all consultants indicated they or their subcontractors would be willing to collect and label voucher specimens if their employers (project proponents) included the activity in contract scopes of work and also included a budget category for voucher specimen collection, preparation, and curation. Workshop participants emphasized that since the overall budgets for major environmental review studies and documents are substantial, it would take only a modest addition to the budget to cover the costs of collecting and depositing voucher specimens.

Recommendation 4. Collection of botanical vouchers and the deposition of them in formal herbaria should be a requirement of the CEQA and NEPA processes. We recommend that the responsible agencies and legislative bodies undertake a review of state and federal legislation and make appropriate amendments that will result in the collection and preparation of botanical vouchers becoming a formal part of the environmental review process.

Although the workshop participants realized that these recommendations have no particular legal status, there was agreement that any influence that resulted in an improvement in the documentation process could enhance greatly the validity of the environmental review process.

Probably the most important point to remember about CEQA is that it is a law enforced by the public. That is, no government body has the authority to oversee and regulate implementation of CEQA; rather, it is the public's responsibility to "regulate" the environmental review process and "make" the lead agency fulfill the intent of this full disclosure law. If the botanical community is not satisfied

with the botany sections of EIR's because they are not supported by voucher specimens, CEQA documents may be ripe for criticism.

Professional standards are generally applied as the guidelines to follow by each profession. For example, cultural, historic, and paleontological sites are all recorded and submitted to databases as part of the CEQA and NEPA review processes because sites containing these resources are considered important by archaeologists, historians, and paleontologists, respectively.

The panelists and workshop participants, many of whom are botanists, also consider the botanical resources of a site to be important and we think these resources should receive appropriate levels of documentation, including the collection and curation of voucher specimens.

Topic II- Collecting Guidelines: Documentation of Experimental Research with Herbarium Voucher Specimens

WORKSHOP FINDINGS: Although there is continuing growth in experimental botanical research, particularly at the molecular level, many if not most experimental research projects are not documented with voucher specimens deposited in formal herbaria. In what may be interpreted as an expanding gap between herbaria as repositories for scientific vouchers and the experimental academic as well as the applied biological communities, herbaria are often left to defend themselves against a declining user base.

As participants in this workshop, we find the lack of documentation with vouchers to be alarming. Goldblatt et al. (1992) in their article Documenting Scientific Data: The Need For Voucher Specimens state that, "Vouchers are central to any serious questioning or reexamination of data and conclusions. An unexpected result may be due to convergence or to past misinterpretation of morphology and other characters, but it may also be caused by misidentification of the plant examined."

Ecological studies are not immune from the practice of not documenting taxa in studies. Recently, one of the authors, T. Sholars, gave a seminar on the "Vegetation and Flora of Mendocino County's Pygmy Forest" to a group of scientists whose research site was in the Pygmy Forest. During the slide presentation of the common plants, it was discovered that the researchers had misidentified *Myrica californica* (Myricaceae), one of the taxa from which chemical extractions had been taken, as *Heteromeles arbutifolia* (Rosaceae).

We offer the following recommendations to the scientific community and to academic institutions that support herbaria.

Recommendation 5. Preparation of botanical voucher specimens should be encouraged as an important part of the scientific process.

Institutions and departments that house or otherwise support herbaria should develop policies regarding the deposition of vouchers by students, staff, and faculty. Support for herbaria should come not only from the host institution or department, but also from the users who deposit specimens. Agencies or corporations that fund research should be made aware of the importance of voucher specimens and should request that the preparation and curation of vouchers be included as a regular part of proposals and budgets.

Quoting again from Goldblatt et al. (1992), "Absence of a voucher makes it impossible to reassess identity. To avoid potential future problems, we suggest that leading scientific journals insist on the citation of an existing herbarium voucher and an indication of its location. Absence of a voucher for critical taxa should be explained so that readers are somehow assured of the identity of the study materials."

A workshop-proposed policy for scientific journals to require the collection and deposition of voucher specimens that provide documentation for published papers also received strong support, but was not part of this approved recommendation. It was noted that too many papers are published with no mention as to whether vouchers were prepared or in which repository they are housed. There was agreement that if specific voucher specimens were not cited by collector, collection number, and institution, at least a mention of the institution in which all specimens were deposited would be an important improvement over the current situation.

Recommendation 6. Academic institutions should include in their curricula opportunities to expose all students to the importance of scientific documentation and the need to prepare and preserve botanical and other biological voucher specimens. There is an urgent need to educate students in the importance and functions of systematics collections whether these students anticipate a future in academic or applied science or want to be well-rounded citizens concerned with California's natural resources or experimental processes.

Workshop participants stressed the need for researchers and students to work cooperatively with peers of many disciplines. Many students are no longer trained in many traditional areas of science, and thus they are not exposed to the need for and process of scientific documentation with voucher specimens or the preservation of archival materials for applied or academic projects. Besides putting scientific accuracy at stake due to the lack of voucher specimens, this can result in the under-utilization of herbaria at academic institutions, because fewer professions refer to or deposit specimens in these herbaria not because it is unnecessary but because the re-

searchers have not been trained to do so. The broad reduction in the support of systematics collections in general, which comes oddly enough at a time when there is an increasing interest in biological diversity, is not because of a reduced need for systematics collections such as herbaria, but because there is a reduction in the understanding of the importance of these collections and the programs associated with them.

Topic III- Documentation Techniques: Presentation of Hierarchical Data on Specimen Labels

WORKSHOP FINDINGS: Many herbarium specimens lack clear and complete hierarchical geographic and habitat data that generally make such specimens less useful for a wide range of studies. Because of the increasing accessibility of computers, programs, and networks, there is an increasing ability to make use of many forms of hierarchical data that can be associated with herbarium specimens.

The primary purpose of locational data on herbarium labels is to provide evidence as to where the plant was growing so that the site could be revisited if desired. If the label does not provide enough information to relocate the site, it has reduced value. Hierarchical data are building blocks of information that are more specific with each level. For example, a label stating that a plant was found in California doesn't tell you much. At the other extreme, a label stating that a plant was collected at Dry Lakes Ridge doesn't tell much either, unless you have a priori knowledge that Dry Lakes Ridge is in the western Transverse Ranges of Ventura County, California. Additional locality data such as "300 m west of Hwy. 33 at milepost 14.38; elev. 3,825 feet," pinpoints the collection site precisely.

The results of a written survey questionnaire answered by 18 individual consultants from 11 consulting firms as part of this workshop indicate that most respondents provide locality and habitat data on their voucher specimen labels. However, few respondents routinely provide complete hierarchical locational data or habitat data. Fewer respondents regularly provide phenological or population size data. Lack of time, as a result of an inadequate project budget, was the reason identified most commonly for sparse label data.

Recommendation 7. Herbarium specimen collectors and label preparators should take every opportunity to include a wide range of hierarchical data on specimen labels, consistent with existing standards, that will increase the usefulness of specimens and will make access to the information possible through computerization of label data.

The most useful presentation of locational data is to start with the general (coarse-scale) and then provide successively more specific location information. By providing locational data on labels in this manner, a user can obtain these data at whatever level of detail is needed. This format also lends well to computer data entry. The database can then be used to retrieve individual variables or sets of variables, to produce floristic checklists, print labels, and conduct biogeographical research. However, it was noted at the workshop that it is better to have specimens that document the resources of a site, or that document a project regardless of the detail of the label data, than it is to have no specimens at all. Individuals should be encouraged to provide accurate and detailed data, but should not be made to feel inadequate because they have failed to provide detailed label data according to rigorous professional standards.

Recommendation 8. One category of hierarchical data associated with herbarium specimens should be that which (1) identifies the project for which the specimen serves as a voucher, (2) lists the client, agency, and/or institution associated with the project, and (3) names the report in which the specimen is cited.

To identify properly a specimen with a specific project, the collector needs to supply the project name, project proponent or land owner, lead agency, and title and date of the report in which it is cited. These data can easily be presented in the specimen label as headers (titles) or footers (footnotes). If numerous labels are needed because many specimens were collected, preprinted labels with these data or computer-generated labels can save time and money.

Recommendation 9. Investigate the feasibility of integrating voucher specimen label data with computerization efforts such as the Specimen Management System for California Herbaria (SMASCH) to provide mechanisms for biogeographical and floristic studies.

Significant advances have been made in the last few years in the areas of data management and spatial analysis with computer and satellite systems that have direct applications to floristic research. Accurate locational data can be easily obtained from geostationary satellites using Global Positioning System (GPS) units and storing these data, along with any point, line, or spatial attributes desired, and creating an interactive geographic information system (GIS) database. GPS can be useful during field work to determine accurately (and relatively easily) the site location, including site elevation. GIS can be an invaluable tool to assist researchers in analyzing spatial attributes of a site and can be used to study floristics, especially if the SMASCH database is linked to it. For example, the distribution, edaphic, geological, and climatic variables of a partic-

ular taxon can be studied simply by downloading records of herbarium specimens into a GIS that has topographic, geologic, soils, vegetation, and climatic data layers. Queries are then developed to look for environmental patterns that may explain or give clues to distributional pattern.

Topic IV- What Will the Future Hold for Documentation of California's Botanical Heritage?

WORKSHOP FINDINGS: The changing nature of the political and economic world has direct implications for the future of California's botanical heritage and for the methods we use to document this heritage. There is a greater need than ever (1) to provide support for documentation centers such as herbaria, botanical gardens, libraries, organizations, and agencies; (2) to have coordination of activities among those organizations interested in the documentation and preservation of the botanical heritage; and (3) to strengthen and expand support for academic programs that will educate future generations of professionals who will have an even greater demand on their abilities to document and preserve natural resources such as the state's botanical heritage.

The participants of the Jepson Symposium offer the following recommendations to the responsible parties:

Recommendation 10. The Association of California Herbaria (ACH) should take an active role in organizing support for and preservation of California's herbaria.

In the Bylaws of ACH, the following purpose of the organization is stated: "The Association is organized under the General Nonprofit Corporation Law of the State of California for purposes of (1) promoting the development and use of California herbaria, (2) effecting cooperation among California herbaria, and (3) increasing the awareness of the value of these herbaria for a) maintenance and management of botanical diversity, b) research in taxonomy and evolution of plants, and c) training and education concerning plant resources." There is an urgent need to fulfill this purpose to assist with the conservation of the State's botanical resources, many of which are threatened or endangered.

Recommendation 11. The Association of California Herbaria, the California Native Plant Society (CNPS), and the California Botanical Society (CBS) should coordinate their activities toward (1) preservation of California's botanical heritage; (2) long-term support for California's botanical education and documentation centers; and (3) improved documentation of California's botanical resources through implementation of statewide policies regarding the collection, prep-

uration, and curation of voucher specimens for academic and applied environmental and experimental botanical studies.

This workshop convened by The Friends of the Jepson Herbarium is perhaps the most opportune time to provide a focus for this recommendation. Two panelists for the workshop, Wayne R. Ferren Jr. and David L. Magney, are presidents of CBS and CNPS, respectively. Furthermore, Brent Mishler, who is Director of the Jepson and University Herbaria, is Chair of the Executive Committee of ACH. Participants in the Jepson Symposium and this workshop urged officers of these organizations to take a lead in the coordination of standards for botanical collecting and documentation.

Recommendation 12. Local, state, and federal agencies should strengthen and expand (1) their requirements for documentation of environmental reports, particularly in the requirement for voucher specimens; and (2) their relationship with academic institutions and organizations (e.g., ACH, CNPS, CBS) to assist with the professional documentation of environmental work and with the education of future agency staff and consultants; and (3) their support for herbaria that house voucher specimens, which document the botanical resources of public lands and which document the disclosures in reports required by the CEQA and NEPA processes.

Environmental documents prepared under CEQA/NEPA would be improved if they were supported by voucher specimens, and would substantially increase the knowledge of California floristics simply by greatly increasing the volume of plant collections deposited in public herbaria. Furthermore, the quality of botanical collections would likely improve if the agency or consulting botanist knew their work would be scrutinized. Many environmental documents prepared to date under CEQA or NEPA contain extensive checklists of unsubstantiated observations of plants. Without supporting voucher collections, these checklists have no scientific value because they cannot be verified. The panelists and many of the workshop participants have seen one or more lists that contain doubtful observations. Only voucher specimens provide adequate evidence of findings to the scientific community and public at large.

Recommendation 13. Regulatory agencies and other responsible parties should consider developing a formal inter-relationship between (1) agencies or their consultants and (2) academic institutions or museums, whereby the institutions would provide for fee the botanical documentation portion of environmental reviews. Such an arrangement would reduce or eliminate any burden public agencies or private corporations might anticipate from collecting and

curating botanical voucher specimens, while insuring the collection and preservation of important specimens.

Some concern was expressed during the workshop that this recommendation might result in the exclusion of small, independent, botanical consulting companies from performing botanical documentation. The panelists indicated that such an interpretation was never intended, particularly because the best ratio of specimens collected to plants reported is generally achieved by the smaller firms that often serve as subconsultants to larger corporations or agencies. The recommendation does suggest that there can be a way to achieve an improvement in botanical documentation by developing relationships with academic institutions that have formal herbaria, especially if botanical expertise is not available at the desired level of authority from private consultants.

Recommendation 14. The academic institutions of California should continue and expand support for botany programs and herbaria because the documentation and preservation of California's botanical heritage and the future of botanical research contributions depend upon the education of scientists, resource managers, planners, and consultants who have strong backgrounds in professional botanical training.

A discussion by panelists and participants alike focused on the lack of botanists trained to conduct inventories and to prepare voucher specimens of California's flora. Examples of jobs now available in the field of environmental consulting were plentiful; however, there are not enough qualified botanists to satisfy the current job market. For example, timber harvest plans require botanical inventories of rare species on lands under the jurisdiction of the U.S. Forest Service. However, there are not enough professionally-trained botanists within the agency (and other agencies) or among those applying to agencies to conduct the studies.

One of the reasons for the lack of adequately-trained personnel is that many universities and colleges have decreased or eliminated their basic offering in plant taxonomy and systematics. In an additional blow to academic programs, funding for herbaria and other systematics collections has been one of the first items to receive cuts or elimination, and at some institutions, herbaria have been closed and/or transferred to other institutions. To fulfill the state and federal mandates to protect our natural resources, it is imperative that academic institutions return to training qualified botanists to do basic inventory work. This need may never have been more apparent than now, as the nation embarks on a National Biological Survey, the results of which may help guide national and state policy regarding natural resources for years to come.

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We thank the many and varied participants of this workshop for their enthusiastic response and sincere interest in the topics discussed at this Jepson Symposium workshop. We thank The Friends of the Jepson Herbarium for sponsoring this Symposium and for inviting us to organize a workshop on botanical collecting and documentation. We also thank the Editor and the California Botanical Society for providing the opportunity to publish the results of this workshop, and an anonymous reviewer of the draft manuscript for raising additional issues and concerns.

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